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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,557	11/19/2003	Henning Bulow	Q78455	5047

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EXAMINER	
LE, THI Q	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/715,557	BULOW ET AL.	
	Examiner	Art Unit	
	Thi Q. Le	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/19/03, 03/08/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

2. The information disclosure statements (IDS) filed on 11/19/2003 and 03/08/2004 were considered by the examiner.

Claim Objections

3. Claim 3 is objected to because of the following informalities:

a) On **line 2** of **claim 3**, replace "is provided" with --are provided, -- after "forward signal taps".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 9-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. A method claim must clearly state active steps for performing the method. The use of a wherein clause is designed to further limits a previous claimed element. Applicant may use the wherein clause to further limit the claims without the use of the words "method according to".

6. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Because it's not clear what method step the computer program is performing

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 13 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 1-5 and 8** are rejected under 35 U.S.C. 102(e) as being anticipated by **Glingener et al. (US PGPub 2003/0072513)**.

Consider **claim 1**, Glingener et al. clearly show and disclose, a polarization mode dispersion controller device (read as, differential group delay time compensator (DGDTC) device 21; figure 2) for controlling the state of polarization of an optical light wave, in particular in a terabit optical network (read as high data rate optical signal; paragraph 0035), comprising a dispersion compensation unit (read as, compensation devices 26, 27; figure 2, paragraph 0046) and an adaptation control unit (read as, PMD compensation device control devices 50a, 50b; figure 2, paragraph 0059), wherein the dispersion compensation unit is fed with an incoming optical light wave, wherein the dispersion compensation unit comprises a multitude of compensation stages (read as, compensation devices 26, 27 within the DGDTC device 21; figure 2) processing the optical light wave, wherein the dispersion compensation unit provides an equalized optical light wave (read as, output signal on optical fiber 14; figure 2), and wherein the adaptation control unit controls the dispersion compensation unit (paragraph 0064), wherein that at least one feed-forward signal tap (read as, optical coupling device 32; figure 2) is provided tapping the optical light wave inserted into one of the compensation stages, that the feed-forward signal(s) tapped by the feed-forward signal tap(s) is(are) fed into a distortion analyzer unit (read as, PMD detection devices 34; figure 2), and that the distortion analyzer unit provides the adaptation control unit with information about the incoming optical light wave for setting the dispersion compensation unit (abstract; figure 2; paragraphs 0044, 0046, 0059 and 0064).

Consider **claim 2, and as applied to claim 1 above**, Glingener et al. further disclose, wherein only one feed-forward signal tap (read as, optical coupling device 32; figure 2) is

provided tapping the incoming optical light wave inserted into the first compensation stage (read as, PMD compensation device 26) (abstract; figure 2; paragraph 0048).

Consider **claim 3, and as applied to claim 1 above**, Glingener et al. further disclose, wherein a multitude of feed-forward signal taps (read as, optical coupling devices 32, 37; figure 2) is provided tapping the optical light wave as inserted at different compensation stages each (read as, PMD compensation device 26, 27) (abstract; figure 2; paragraph 0048).

Consider **claim 4, and as applied to claim 1 above**, Glingener et al. further disclose, wherein the distortion analyzer unit (read as, PMD detection devices 34; figure 2) determines the state of polarization (read as, using the PMD vectors in Stoke space to determine the orientation of the Principal States of Polarization; figure 3; paragraph 0076) of the incoming optical light wave as a function of the frequency of the incoming optical light wave based on the feed-forward signal(s) (figure 3; paragraph 0076).

Consider **claim 5, and as applied to claim 1 above**, Glingener et al. further disclose, wherein the distortion analyzer is suitable for analyzing a not polarization scrambled signal. Since Glingener et al. referred to the input signal to the DGDTC device as Light wave, and the nonexistence of mentioning that the input signal is a polarization scrambled signal. Therefore, the input signal to the input signal to the DGDTC device is considered to be a "not polarization scrambled signal" (considering Glingener et al. invention as a whole).

Consider **claim 8, and as applied to claim 1 above**, Glingener et al. further disclose, wherein the PMD controller device (read as, differential group delay time compensator (DGDTC) device 21; figure 2) further comprises a feedback signal tap (read as, optical coupling device 44; figure 2) tapping the equalized optical light wave, that the adaptation control unit

(read as, PMD compensation device control devices 50a, 50b; figure 2, paragraph 0059) is fed with the feedback signal (read as, signal from optical waveguide 45) provided by the feedback signal tap.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Glingener et al. (US PGPub 2003/0072513)** in view of **Barwicz et al. (US Patent # 6,826,331)**.

Consider **claim 6, and as applied to claim 1 above**, Glingener et al. disclosed the invention as described above; except for, wherein at least one feed-forward tap comprises a wavelength demultiplexer unit and that the distortion analyzer unit is fed with the demultiplexed signals provided by the wavelength demultiplexer unit(s).

In related art, Barwicz et al. disclose a wavelength monitoring apparatus for monitoring multi wavelength optical signal. Referring to figure 4, the optical signal propagating through fiber 21 is tapped by an optical tap 22. The tapped signal is provided to an optical array waveguide grating 400 (read as, wavelength demultiplexer unit) for splitting the tapped optical signal into multiple wavelengths (abstract; figure 4; column 6 lines 49-60).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Barwicz et al. with Glingener et al. Since demultiplexing the optical signal into individual wavelength signal, allow the system to monitor closely the effect of PMD for each individual wavelengths. Therefore, providing more information to the controller and allow for more accurate control of PMD compensation devices.

14. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Glingener et al. (US PGPub 2003/0072513)** in view of **Moeller et al. (US Patent # 6,538,787)**.

Consider **claim 7, and as applied to claim 1 above**, Glingener et al. disclosed the invention as described above; except for, wherein the dispersion compensation unit comprises a planar light wave circuit with a polarization splitter at the signal input of the PLC, a multitude of 3 dB couplers and preferably a polarization combiner at the signal output of the PLC, wherein

these components of the PLC are connected in series, with each connection comprising a first waveguide and a second waveguide comprising a tunable phaseshifter.

In related art, Moeller et al. disclose, an apparatus and method for polarization mode dispersion compensation. Referring to figures 8 and 12, a PMD compensator comprises polarization beam splitter PBS (read as, polarization splitter); a plurality of 3 dB couplers C (read as, multitude of 3dB couplers) are set along the connection series; a plurality of waveguide pairs connection each 3 dB coupler with another 3 dB coupler along the connection series, wherein one of the waveguide in the waveguide pair comprises a phase modulator (read as, phaseshifter); and a polarization beam combiner PBC (read as, polarization combiner) at the end of the connection series (abstract; figure 8, 10 and 12; column 9 lines 1-30; column 10 lines 10-25; column 11 lines 44-50).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Moeller et al. with Glingener et al. Since Moeller et al. a particular PMD compensation device while, Glingener et al. provides a multi stage PMD compensation device. The PMD compensator of Moeller et al. can be incorporate into one of the PMD compensation in the device disclose by Glingener. A variety of different stages of PMD compensation will further improve PMD compensation in optical transmission network.

15. **Claims 9-11 and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Glingener et al. (US PGPub 2003/0072513)** in view of **Yan et al. (US Patent #7,067,795, with provisional date 10/3/2002)**.

Consider **claim 9, and as applied to claim 8 above**, Glingener et al. disclosed the invention as described above; except for, wherein the adaptation control device dithers a number N of parameters smaller than the amount P of tuning parameters.

In related art, Yan et al. disclose a system for controlling the polarization of an optical signal. Referring to figure 1, a feedforward and feedback loop is use to adjust the PMD compensation in the system. A polarization controller comprises a plurality of polarization elements; each of which can be individually adjusted according to the feedforward and the feedback signal. Yan et al. disclosed that only two of the polarization elements may be set in the polarization controller according to the feedforward signal to control the polarization to the desired output, and the remain polarization elements may be controlled according to the polarization output of the whole controller 120 (read as the adaptation control device dithers a number N of parameter smaller than the amount P of the tuning parameters) (abstract; figure 1 and 2; column 5 lines 20-25).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yan et al. with Glingener et al. Because the feedforward loop provide initial information about the optical signal prior to PMD compensation, the information can be use to by the polarization controller to first coarse adjust two polarization elements for changing the polarization of the optical signal to a desired output. Second, the feedback loop can provide further information to the polarization controller to finely adjust other polarization elements to improve the PMD compensation for the output. Therefore, increasing the speed of PMD compensation by a PMD compensator.

Consider **claim 10, and as applied to claim 9 above**, Glingener et al. as modified by Yan et al. further disclose, wherein the distortion analyzer unit (read as, input polarization detection module 110; Yan et al. figure 1) determines the state of polarization (read as, measures the state of the input polarization of the input optical signal; column 3 lines 64-67) of the incoming optical light wave as a function of its frequency, and that the adaptation control device uses the SOP information for controlling the compensation stages (read as, the feedforward control circuit 170 uses the information provide by the polarization detection module 110, to send control signal to the polarization controller 120) (Yan et al.; abstract; figure 1; column 4 lines 25-30).

Consider **claim 11, and as applied to claim 10 above**, Glingener et al. as modified by Yan et al. further disclose, wherein the determination of operating conditions for the compensation stages is accomplished by reading out a table (read as, the feed-forward control circuit 170 have a look-up table setting different configuration of the polarization elements; column 4 lines 14-16) and/or by calculation, in particular taking into account the experimental or numerical determined relation between signal distortion measured by the distortion analyzer unit and the setting of the distortion compensator unit parameters which is required to improve the signal quality at the compensator unit's output (read as, the feedforward control circuit 170 uses the information provide by the polarization detection module 110, to send control signal to the polarization controller 120) (Yan et al.; abstract; figure 1; column 4 lines 25-30).

Consider **claim 13, and as applied to claim 9 above**, Glingener et al. as modified by Yan et al. further disclose, computer program (read as, a programmed microprocessor; column 9 lines 15-20)

16. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Glingener et al. (US PGPub 2003/0072513)** in view of **Yan et al. (US Patent #7,067,795, with provisional date 10/3/2002)** and further in view of **Sobiski (US PGPub 2002/0177912)**.

Consider **claim 12, and as applied to claim 10 above**, it would have been obvious for a person of ordinary skill in the art at the time of the invention to recognize, although not specifically described in writing, Glingener et al. as modified by Yan et al. further disclosed, that the PMD compensation are done continuously, as long as the input optical signal is supplied. To further support the Examiner's answer to claim 12, Sobiski's teachings are introduced.

In the art of PMD compensation, Sobiski disclose an a multi-stage PMD compensation. Wherein the PMD compensation of the input optical signal is continuously maintained (abstract).

Therefore, firmly point out the obviousness that it would have been obvious for a person of ordinary skill in the art at the time of the invention recognize that the PMD compensation are done continuously. The output optical signal needs to constantly be compensated for PMD, no temporal broadening of the pulse does not occurs, or it will cause error in transmission.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Sasaoka et al.; 2001/0048798

b) Weiner, Andrew M.; 2002/0060760

c) Rosenfeldt, Harald; 2003/0053174

d) Willner et al.; 2003/0123884

e) Phua et al.; 7,003,183

f) DeBaun et al.; 7,062,123

18. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

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19. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER